

What is claimed is:

1. A variable speed drive comprising:
  - a converter stage to convert an AC voltage to a DC voltage, the converter stage being configured to be electrically connectable to an AC power source;
  - a DC link stage to filter and store energy from the converter stage, the DC link stage being electrically connected to the converter stage; and
  - an inverter stage comprising a plurality of inverters electrically connected in parallel to the DC link stage, each inverter of the plurality of inverters being configured to convert a DC voltage to an AC voltage to power a corresponding load, and each inverter of the plurality of inverters being configured to operate substantially independently of other inverters of the plurality of inverters.
2. The variable speed drive of claim 1 further comprising a control system to control operation of the converter stage and the inverter stage.
3. The variable speed drive of claim 2 wherein the control system controls the plurality of inverters as a group.
4. The variable speed drive of claim 3 wherein the control system provides one set of control instructions to all inverters of the plurality of inverters to control operation of the plurality of inverters.
5. The variable speed drive of claim 2 wherein the control system individually controls each inverter of the plurality of inverters.
6. The variable speed drive of claim 5 wherein the control system provides a set of control instructions to each inverter of the plurality of inverters to control operation of the corresponding inverter.
7. The variable speed drive of claim 1 wherein the converter stage is configured in a rectifier arrangement having electronic switches that are switchable only to an on position.

8. The variable speed drive of claim 1 wherein the converter stage is configured in a converter arrangement having electronic switches that are switchable to an on position and an off position.
9. The variable speed drive of claim 8 wherein the converter arrangement has a configuration selected from the group consisting of boost conversion, buck conversion and boost/buck conversion.
10. The variable speed drive of claim 1 wherein each inverter of the plurality of inverters comprises wire bonds sized to disconnect the inverter from the DC link stage in the event a fault occurs in one of the inverter and the corresponding load powered by the inverter.
11. The variable speed drive of claim 1 wherein the plurality of inverters comprises one of two inverters and three inverters.
12. The variable speed drive of claim 1 wherein each inverter of the plurality of inverters is configured to provide a voltage and frequency to a corresponding load greater than a rated voltage and frequency of the corresponding load.
13. A chiller system comprising:
  - a first refrigerant circuit, the first refrigerant circuit comprising a first compressor driven by a first motor, a first condenser arrangement and a first evaporator arrangement connected in a closed refrigerant loop;
  - a second refrigerant circuit, the second refrigerant circuit comprising a second compressor driven by a second motor, a second condenser arrangement and a second evaporator arrangement connected in a closed refrigerant loop; and
  - a variable speed drive comprising:
    - a converter stage to convert an AC voltage to a DC voltage, the converter stage being configured to be electrically connectable to an AC power source;
    - a DC link stage to filter and store energy from the converter stage, the DC link stage being electrically connected to the converter stage; and

an inverter stage comprising a first inverter and a second inverter each electrically connected in parallel to the DC link stage, the first inverter being configured to convert a DC voltage to an AC voltage to power the first motor, the second inverter being configured to convert a DC voltage to an AC voltage to power the second motor, and the first inverter being configured to operate substantially independently of the second inverter.

14. The chiller system of claim 13 further comprising a control system to control operation of the variable speed drive.
15. The chiller system of claim 14 wherein the control system provides one set of control instructions to the first inverter and the second inverter, wherein the first inverter and the second inverter provide AC power at a same frequency and voltage to the first motor and the second motor in response to the one set of control instructions.
16. The chiller system of claim 13 wherein the first condenser arrangement and the second condenser arrangement each comprise a portion of a combined condenser system.
17. The chiller system of claim 13 wherein the first evaporator arrangement and the second evaporator arrangement each comprise a portion of a combined evaporator system.
18. The chiller system of claim 13 wherein the first inverter and the second inverter are configured to provide a voltage and frequency to the first motor and the second motor greater than a rated voltage and frequency for the first motor and the second motor.
19. A variable speed drive for a chiller system having a plurality of compressors, the variable speed drive comprising:
  - a converter section to convert an AC voltage to a DC voltage, the converter section being configured to be electrically connectable to an AC power source;

a DC link section to filter and store energy from the converter section, the DC link section having a DC bus being electrically connected to the converter section; and

an inverter section comprising a plurality of inverters electrically connected in parallel to the DC link section, each inverter of the plurality of inverters being configured to convert a DC voltage to an AC voltage to power a corresponding compressor motor, and each inverter of the plurality of inverters being configured to operate substantially independently of other inverters of the plurality of inverters.

20. The variable speed drive of claim 19 further comprising a control system to control operation of the converter section and the inverter section.
21. The variable speed drive of claim 20 wherein the control system controls the plurality of inverters as a group.
22. The variable speed drive of claim 21 wherein the control system provides one set of control instructions to all inverters of the plurality of inverters to control operation of the plurality of inverters.
23. The variable speed drive of claim 20 wherein the control system individually controls each inverter of the plurality of inverters.
24. The variable speed drive of claim 23 wherein the control system provides a set of control instructions to each inverter of the plurality of inverters to control operation of the corresponding inverter.
25. The variable speed drive of claim 19 wherein the converter section comprises at least one silicon controlled rectifier.
26. The variable speed drive of claim 19 wherein each inverter of the plurality of inverters comprises wire bonds sized to disconnect the inverter from the DC link stage in the event a fault occurs in one of the inverter and the corresponding compressor motor.
27. The variable speed drive of claim 19 wherein the plurality of inverters comprises two inverters.

28. The variable speed drive of claim 19 wherein each inverter of the plurality of inverters comprises at least one integrated bipolar transistor power switch and at least one inverse diode.
29. The variable speed drive of claim 19 wherein the DC link section comprises at least one capacitor.
30. The variable speed drive of claim 19 wherein:
  - the DC bus comprises a positive rail and a negative rail;
  - the converter section comprises at least one output connected to the positive rail of the DC bus and at least one output connected to the negative rail of the DC bus; and
  - each inverter of the plurality of inverters comprises at least one input connected to the positive rail of the DC bus and at least one input connected to the negative rail of the DC bus.
31. The variable speed drive of claim 19 further comprising a circuit breaker electrically connected in series between the AC power source and the converter section.
32. The variable speed drive of claim 19 further comprising an autotransformer electrically connected in series between the AC power source and the converter section to convert an AC voltage from the AC power source to a desired AC voltage.
33. The variable speed drive of claim 19 further comprising at least one fuse electrically connected in series between the AC power source and the converter section.
34. The variable speed drive of claim 19 further comprising at least one inductor electrically connected in series between the AC power source and the converter section.